Conclusions

This study confirms the utility of the environmental approach to welfare or poverty mapping, and over a much larger region than heretofore demonstrated (i.e. Uganda). Furthermore the approach appears valid for a region in which there is a much wider range of eco-climatic conditions showing a less obvious trend over the region (as was the case in Uganda, where the dominant eco-climatic trend, and resulting poverty metric, ran from the South-West to the North-East).

The study also shows that it is possible to use the DHS WI as a regional poverty indicator, provided that it is reconstructed from a set of common indicators from the individual DHS surveys.

Obviously there are still some issues to be discussed and steps to undertake. First of all, it is important to test the present models against new field data, or new experts' perspectives of the region. Feedback would tell us both where the current maps are 'right' and where they are 'wrong'.

Whilst the present analysis is region-wide, it is of interest to see if models of the Regional WI at the individual country level are as accurate, or more accurate, than the region-wide model. This will only be possible for the four countries that contributed data to the present exercise; there are no data for the other countries to run the model for them.

As was the case in Uganda, it is important to investigate the scale-dependent accuracy of the current predictions. It is expected that accuracy will increase as the household and satellite data are aggregated into larger geographic units. It is important that this trade-off between accuracy and spatial resolution is resolved at a sufficiently fine spatial unit for the approach to be considered useful by planners, agencies, non-government organisations (NGOs) etc. that are concerned with welfare improvements and poverty alleviation. To know that half a country is poor is of no use if you do not know precisely where the poorest people are located.

High WI values seem to be associated with high human population densities. The reasons for this are difficult to determine with only the data we have at present. It could be because humans acting as individual, free agents congregate in particularly productive areas of the landscape (and consequently enjoy high WI levels), or because aggregations of humans, no matter where they occur, or for what reason, generate sufficient trade and exchange among them so that they collectively enjoy high WI levels regardless of environmental conditions. It appears that these high WI levels are associated with particular sets of environmental conditions, but not the obvious ones that might be expected (e.g. high EVI levels indicating greater photosynthetic activity of all types). Instead the highest WI levels are associated with declining EVI values. Are these lower levels of EVI a cause or a consequence of the high WI values? Has human population pressure in the highest WI areas actually reduced the EVI values through greater or lesser destruction of the natural habitat? Or is it simply that agricultural areas have lower mean EVI values than uncultivated areas (the natural cropping cycle leaves the earth bare for a few months of the year), and the reduction in EVI simply reflects a greater percentage of the ground being brought into the cultivation cycle? These questions raise several key issues about environmental sustainability in areas of highest WI values. We need to know whether high WI values are being achieved at the cost of long-term sustainability.

This paper marks the coming of age of the environmental approach to poverty mapping in Africa. Environmental data may be used to describe welfare across the climatically and sociologically diverse region of the Horn of Africa. One other question remains about this approach. If targeted intervention succeeds in lifting people out of poverty, what changes might we expect to see in the descriptor variables including the environmental signals derived from satellites? For example, cattle densities in Model 3 are at their lowest values in the two highest WI classes. The question is whether these numbers might change as other people currently in lower WI categories (and with more cattle) enter these highest welfare categories. Similarly, this approach raises the question of whether primary production, as indicated by the EVI, will decrease as people currently in the intermediate WI classes (and with high EVI values) become richer.